Bulletin 455 September 1958

THE UNIVERSITY OF NEW HAMPSHIRE
AGRICULTURAL EXPERIMENT STATION

Department of Biochemistry

Inspection of Commercial Fertilizers

Made for the

STATE DEPARTMENT OF AGRICULTURE

H. A. Davis and Ruth Fowler

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DURHAM, N. H.

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This bulletin reports the analysis of 178 official samples of commercial fertilizers and fertilizer materials submitted for analysis during the year ending June 30, 1958.

The inspection of commercial fertilizers was made under the direction of the Honorable Perley I. Fitts, Commissioner of Agriculture. The samples were collected by Mr. George H. Laramie, Fertilizer Control Supervisor.

All questions relating to the New Hampshire Fertilizer Law and the registration of fertilizers or fertilizer materials prior to sale in the state, should be directed to the attention of the Fertilizer Control Supervisor, State House, Concord, New Hampshire. This laboratory is responsible for the analysis only of official samples as submitted.

The general character of the fertilizer and fertilizer materials sampled is shown by the following classification.

Complete fertilizer	115
(Of these, 31 also carried a total Magnesium Oxide guarantee and 19 specified water-soluble Magnesium Oxide.)	
Phosphoric acid and potash	20
(Of these 5 carried a boron guarantee in addition)	
Nitrogen	2
Nitrogen and phosphoric acid	6
Superphosphate	6
Ammonium Nitrate	2
Milorganite	1
Urea	1
Ground Bone	5
Manure	17
Cyanamid	1
Muriate of Potash	2

THE FERTILIZER LAW

All persons concerned with the manufacture, distribution or use of commercial fertilizers should acquaint themselves with the New Hampshire Commercial Fertilizer Law. A booklet titled "New Hampshire Fertilizer Law and Rules and Regulations," may be obtained by writing the State Department of Agriculture, State House, Concord, New Hampshire.

Quotation from the law concerning registration, guarantee and labeling of Commercial Fertilizers in New Hampshire Follows:

Sec. 4: Registration. (a) Each brand and grade of commercial fertilizer shall be registered before being offered for sale, sold or distributed in this state. The application for registration shall be submitted to the commissioner on forms furnished by the commissioner, and shall be accompanied by a fee, per brand, as follows: ten dollars for the phosphoric acid, ten dollars for the nitrogen, ten dollars for the potash, and ten dollars for the magnesium oxide, or other plant food elements, compounds or classes of compounds; contained or claimed to be in the said brand of fertilizer; but the fee for any brand shall not exceed twenty-five dollars. All registrations expire on or before January 1, annually. The application shall include the following information in the following order: (1) The name and address of the person guaranteeing the fertilizer. (2) The brand and grade. (3) The guaranteed analysis showing the minimum percentage of plant food claimed in the following order and form: Total nitrogen per cent; available phosphoric acid per cent; soluble potash per cent; unacidulated mineral phosphoric acid, and the degree of fineness. In the case of bone, tankage, and other natural organic phosphate materials, only the total phosphoric acid need be guaranteed. Additional plant food elements, determinable by chemical methods, may be guaranteed only by permission of the commissioner by and with the advice of the director of the agricultural experiment station. When any such additional plant foods are claimed, they shall be included in the guarantee, and shall be subject to inspection and analysis in accordance with the methods and regulations that may be prescribed by the commissioner.

(b) A distributor shall not be required to register any brand of commercial fertilizer which is already registered hereunder by another person.

(c) The plant food content of each and every brand of commercial fertilizer must remain uniform for the period of registration.

Sec. 5: Labeling. (a) Any commercial fertilizer offered for sale or sold or distributed in this state in bags, barrels, or other containers shall have placed on or affixed to the container in written or printed form the net weight and the informaion required. (1), (2) and (3) of paragraph (a) of section 4 either (1) on tags affixed to the end of the package between the ears and or on the sewed end or (2) directly on the package. (b) If distributed in bulk, a written or printed statement of the weight and the information required by (1), (2) and (3) of paragraph (a) of section 4 shall accompany delivery and be supplied to the purchaser.

Penalty provisions — The Law provides for the levying of a penalty amounting to three times the commercial value of the constituent found deficient when deficiencies exceeding allowed tolerances are found. The following table of tolerances as adopted by the State Department of Agriculture is quoted from the Rules and Regulations of that Department.

Total Nitrogen		Available Phosphoric Acid		Soluble Potash	
Guarantee	Deficiency	Guarantee	Deficiency	Guarantee	Deficiency
2%	0.20	0-10% inc.	0.40	2%	0.20
3%	0.25	10-25% inc.	0.50	3%	0.30
4%	0.35	Over 25%	0.75	4%	0.40
5-8% inc.	0.40			4-8% inc.	0.50
8-30% inc.	0.50			8-20% inc.	0.60
Over 30%	0.75			Over 20%	1.00

The chief purpose of the official inspection of fertilizers is to protect the consumer against misbranded products that probably would soon appear on the market if the sale of fertilizer was not under state regulation. If the consumer accepts fertilizer not labeled in compliance with the law, he does so at his own risk. He should acquaint himself with the requirements of the law concerning labeling and be familiar with the terms and symbols used on the label.

A commercial fertilizer generally supplies one or more of three elements: nitrogen, phosphorus and potassium; which are commonly required in relatively large amounts for plant growth. The percentage of each of these three materials is represented by numerals in designating the grade of a fertilizer. These percentages are presently expressed in terms of nitrogen, phosphorus pentoxide and potash and the symbols used are N, P_2O_5 and K_2O respectively. The term phosphoric acid is commonly used when referring to the phosphorus content.

Under certain conditions, other elements such as magnesium, boron and other so-called minor elements are needed to correct soil deficiencies in certain localities. These may be included in the mixed fertilizer.

Much advertising of fertilizer materials packed in small packages is directed to the attention of the home gardener and growers of house plants. This small package serves a definite need, however the "miracle" results claimed may not always be obtained. In general, it is more economical for the gardener to purchase fertilizer of a reliable brand and in reasonably large packages.

All control officials charged with the enforcement of state laws regulating the sale of commercial fertilizers and fertilizer materials are joined in the Association of American Fertilizer Control Officials. Research workers employed by State or Federal Agencies engaged in the investigation of fertilizers are also members of this Association. The object of this organization is to "promote uniform and effective legislation, definitions, rulings, and enforcement of laws relating to the control of sale and distribution of mixed fertilizers and fertilizer materials in the Continent of North America. At the annual meetings of the Association, reports and recommendations of investigators concerning definitions of fertilizer materials, use of new products, and problems concerning regulation of the fertilizer trade are discussed in detail. Fertilizer manufacturers are invited to participate; in these discussions and through mutual cooperation, the farmer is supplied with a product that can be relied upon to do the job expected in crop production. The official publication of the Association may be obtained for a small fee through the office of its secretary, B. D. Cloaninger, Clemson, South Carolina. This booklet contains the official terms describing fertilizer materials, a proposed model state fertilizer law, as well as the proceedings of the annual meeting.

Whether or not a fertilizer contains the guaranteed amount of plant food can be determined only by a chemical analysis. For this reason, it is considered necessary that each brand of fertilizer offered for sale be officially sampled and analyzed each year.

When failure to meet the guarantee is proved by chemical analysis, the prosecution or seizure provisions of the law may be invoked. The purchaser's refusal to buy a fertilizer which does not conform to the law will not only assist in the enforcement of the law, but will at the same time insure him the protection of the law.

Control officials are giving the matter of excessive ash in sheep and cattle manure samples their attention. Total ash was determined in each of the 17 samples of dried manure drawn this year. The percent ash found varied from 1.31% to 50.85%. Excessive ash content is indicated when the amount is over 30% and adulteration with sand or "dirt" is likely. Even with high ash content the guarantees are usually met because the amount of plant food in manures is relatively small. The point is that manures are bought to supply a considerable amount of organic matter. A high ash content indicates a relatively low organic matter content. This problem is being given special attention by New England control officials.

USE OF COMMERCIAL FERTILIZERS

It is not within the scope of this department to make recommendations regarding the use of commercial fertilizers. The Department of Agronomy and the Department of Biochemistry of the University of New Hampshire Agricultural Experiment Station test soils and conduct experimental work with various fertilizer materials on hay and crop land. The Department of Horticulture investigates fertilizer treatments for fruits and vegetables. Much of this work has been published, and is available for free distribution to residents of New Hampshire. Address your request to Mail Service, University of New Hampshire, Durham, New Hampshire. A list of currently available publications on fertilization follows:

Ext. Bull.	100	Growing Apples in New Hampshire.
Ext. Bull.	104	Growing Vegetables at Home.
Ext. Bull.	105	Asparagus in New Hampshire.
Ext. Bull.	118	Growing Potatoes in New Hampshire.
Ext. Bull.	125	Growing Strawberries in New Hampshire.
Ext. Bull.	129	Forage Crop Production in New Hampshire.
Ext. Cir.	275	Culture of Low-Bush Blueberries.
Ext. Cir.	309	Growing Grapes in New Hampshire.
Ext. Cir.	310	Cane Fruit Culture.
Ext. Cir.	314	Tomatoes for New Hampshire.
Sta. Bull.	424	Soils and Their Crop Adaptation in New Hampshire.
Sta. Bull.	439	Forage Variety Trials in New Hampshire 1951-1956.
Folder		New Hampshire Recommendations for Seed, Fertilizer and Lime.

While the word "fertilizer" does not appear in all of the above titles, none is included which does not discuss the use of fertilizer.

CONFORMITY TO GUARANTEE

The chemical analyses reported in this bulletin were made by the methods adopted by the Association of Official Agricultural Chemists. The following list indicates the number of samples equaling or failing to meet guarantee:

Number of samples analyzed	178
Equalling or exceeding all guarantees	88
Deficient in nitrogen only	41
(12 subject to penalty)	
Deficient in phosphoric acid only	20
(9 subject to penalty)	
Deficient in potash	13
(7 subject to penalty)	
Deficient in nitrogen and phosphoric acid	5
(1 subject to penalty in nitrogen)	
(3 subject to penalty in phosphoric acid)	
Deficient in nitrogen and potash	3
(1 subject to penalty in both)	
(1 subject to penalty in phosphoric acid)	
(1 subject to penalty in potash)	
Deficient in phosphoric acid and potash	5
(1 subject to penalty in both)	
(2 subject to penalty in phosphoric acid)	
(1 subject to penalty in potash)	

Deficient in nitrogen, phosphoric acid and potash	2
(1 subject to penalty in potash)	
Deficient in magnesium oxide	1

Fifty samples were guaranteed to contain magnesium oxide. Of these nineteen guaranteed in terms of water soluble magnesium oxide. All magnesium oxide guarantees were met with one exception.

Penalties were assessed on 38 different lots of fertilizers representing 14 grades. Four grades, 0-15-30, 8-16-16, 5-10-10-2 and 5-10-10-5 were involved in 23 of the lots penalized. The others were scattering, one or two only in a particular grade. The penalty clause was invoked in fifteen cases for nitrogen, fifteen cases for phosphoric acid and ten cases for potash shortages. These cases are noted in the table of analyses by bold type and by underline. The manufacturers are listed alphabetically and the brand names by formula and alphabetically under the name of the manufacturer.

There are far too many small deficiencies as shown by the fact that only 88 out of 178 samples met all guarantees. This problem is of serious concern and considerable cooperative work is underway to solve the problem. Fertilizers are largely mixtures of chemicals. Segregation of these materials in the bag is difficult to prevent. Modern methods of fertilizer manufacture are doing much to process the fertilizer in such a way that segregation will be avoided. The solution of this problem is difficult. To obtain a truly representative sample of a fertilizer mixture requires careful work. The chemist can accurately determine the nitrogen, phosphoric acid, and potash content of the sample sent to the laboratory. If this sample does not correctly represent the larger lot, the analytical work is of no use. The obligation of the fertilizer control program is to see that the manufacturer is supplying the guaranteed amount of plant food to the consumer. For this reason, the sample must be drawn and analyzed very carefully so that injustice will not be done to either the consumer or manufacturer.

COMMERCIAL VALUE OF FERTILIZERS

Section 10. of the New Hampshire Fertilizer Law of 1955, states, "For the purpose of determining the commercial values to be applied under the provisions of Section 7., the Commissioner shall determine and publish annually, the values per pound of nitrogen, phosphoric acid and potash in commercial fertilizers in this State. The values so determined and published shall be used in determining and assessing penalties."

After consulting the fertilizer manufacturers selling the major tonnage of fertilizer in New Hampshire, the Commissioner established and the Agricultural Advisory Board approved on June 9, 1958, the following commercial values per pound of nitrogen, phosphoric acid and potash:

$3.00 per Unit or 15 cents per pound of Nitrogen*
$2.00 per Unit or 10 cents per pound of Phosphoric Acid*
$1.20 per Unit or 6 cents per pound of Potash*
$1.25 per Unit or 6 cents per pound of Magnesium Oxide — ($\frac{1}{2}$ of 1% Tolerance)

*see page 2 or a copy of the law for tolerances

June 17, 1958
The New Hampshire Department of Agriculture
Concord, New Hampshire

	Sample Drawn In	Nitrogen (N)		Phosphoric Acid (P_2O_5)				Potash (K_2O)		Magnesium Oxide (MgO)	
				Total		Available					
		Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
AG Products Co.											
W. Kingston, R. I.											
(a) Meadow Brand Sheep Manure — Wool Combing and Inert Matter	Nashua	1.40	1.52	0.35	0.35			2.00	4.20		
Allied Chemical & Dye, Nitrogen Div.											
Houewell, Va.											
(F) Arcadian Urea 45 Fertilizer	Brentwood	45.00	45.46								
American Agricultural Chemical Co.											
N. Weymouth, Mass.											
(F) AA Fertilizer 0-15-30	Concord				14.95	15.00	14.80	30.00	31.52		
(F) AA Fertilizer 0-20-20	Lacona				20.60	20.00	20.38	20.00	20.09		
(F) AA Fertilizer 5-10-10-2	Concord	5.00	5.06		10.55	10.00	9.63	10.00	9.64	2.00	3.23
(F) AA Fertilizer 5-10-10-2	Concord	5.00	5.15		10.36	10.00	**9.33**	10.00	9.80	2.00	3.36
(F) AA Fertilizer 5-10-10-2	Grasmere	5.00	5.16		10.39	10.00	**9.39**	10.00	9.60	2.00	3.42
(F) AA Fertilizer 5-10-10-2	Laconia	5.00	**4.32**		11.88	10.00	11.30	10.00	11.64	2.00	2.89
(F) AA Fertilizer 5-10-10-2	W. Stewartstown	5.00	5.23		11.29	10.00	10.30	10.00	9.76	2.00	2.64
(F)* AA Fertilizer 8-12-12	Laconia	8.00	8.11		12.44	12.00	12.16	12.00	12.88		
(F) AA Fertilizer 8-16-16	Glencliff	8.00	7.80		16.70	16.00	16.40	16.00	16.32		
(F) AA Fertilizer 8-16-16	Contoocook	8.00	8.13		16.76	16.00	16.40	16.00	16.16		
(F) AA Fertilizer 10-10-10	Concord	10.00	9.78		10.52	10.00	10.24	10.00	10.68		
(F) AA Fertilizer 10-10-10	Concord	10.00	9.74		10.52	10.00	10.19	10.00	10.08		
(F) AA Fertilizer 10-10-10	Contoocook	10.00	9.82		11.00	10.00	10.70	10.00	10.08		
AA Lawn & Garden Fertilizer 5-10-5	Portsmouth	5.00	5.00		10.38	10.00	9.68	5.00	5.04		
AA Lawn & Garden Fertilizer 5-10-5	Londonderry	5.00	5.18		11.24	10.00	10.37	5.00	5.34		
Agrico Bone Meal	Portsmouth	1.50	2.17	25.00	29.60						
Agrico Bulb Food 5-9-6	Concord	5.00	5.10		9.78	9.00	9.75	6.00	6.60		

(F) Sampled at a Farm
(a) Acid Insoluble Ash — 48.85
* Not Registered when Sampled

	Sample Drawn In	Nitrogen (N)		Phosphoric Acid (P_2O_5)				Potash (K_2O)		Magnesium Oxide (MgO)	
				Total		Available					
		Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
American Agricultural Chemical Co. N. Weymouth, Mass. (continued)											
Agrico for Lawn, Trees & Shrubs 6-10-4	Portsmouth	6.00	6.11	.....	10.33	10.00	9.56	4.00	4.30		
(F) Agrico for New England 8-16-8	N. Stratford	8.00	7.64	.....	14.49	16.00	**14.04**	8.00	8.60		
Agrico for Top Dressing 7-7-7	Portsmouth	7.00	6.66	.....	7.64	7.00	7.48	7.00	7.38		
Agrico for Turf 6-8-2	Portsmouth	6.00	6.33	.....	8.45	8.00	8.01	2.00	2.60		
Agrico New England 5-8-7	Portsmouth	5.00	5.07	.....	8.50	8.00	8.01	7.00	7.26		
Agrico Rose Food 5-9-6	Concord	5.00	5.10	.....	9.94	9.00	9.01	6.00	7.20		
Agrico Top Dressing 10-10-10	Portsmouth	10.00	10.04	.....	10.28	10.00	10.09	10.00	10.40		
18% Normal Superphosphate	Portsmouth	.....	.....	.....	18.82	18.00	18.59				
American Cyanamid Co. New York 20, N. Y.											
Aero Cyanamid Granular 21%	Bow	21.00	21.02	.....	.....	.....	.....	.....	.....	.....	.....
Aeroprills — Ammonium Nitrate Fertilizer	Derry	33.50	33.56	.....	.....	.....	.....	.....	.....	.....	.....
(F) Aeroprills — Ammonium Nitrate Fertilizer	Concord	33.50	33.65	.....	.....	.....	.....	.....	.....	.....	.....
Armour Fertilizer Works Carteret, N. J.											
*(b) Armour Cattle Manure	Nashua	2.20	2.07	1.00	1.11	.....	.....	2.00	2.76		
* Armour Plant Food for Tomatoes 6-12-12	Nashua	6.00	5.81	.....	12.92	12.00	12.14	12.00	12.00		
(c) Armour Sheep Manure & Inert Matter	Nashua	1.25	1.29	1.00	1.45	.....	.....	2.00	4.20		
Armour Vertagreen Plant Food 5-10-5	Nashua	5.00	5.03	.....	11.82	10.00	10.56	5.00	5.40		
* Armour Vertagreen Rose Food 5-10-5	Nashua	5.00	5.13	.....	12.92	10.00	11.96	5.00	5.26		
* Armour Vertagreen Turf Maker 8-6-2	Nashua	8.00	8.04	.....	7.30	6.00	6.57	2.00	3.20		
Armour Vertagreen 10-6-4 for Turf & Trees	Nashua	10.00	10.24	.....	7.66	6.00	7.07	4.00	4.08		

F. A. Bartlett Tree Expert Co. Cambridge, Mass.											
(F) Bartlet Green Tree Food 6-8-6	Concord	6.00	6.31		9.14	8.00	8.58	6.00	6.60		
Joseph Breck & Sons Boston 10, Mass.											
Breck's Bone Meal 2.5-20-0	Nashua	2.50	2.73	20.00	26.55						
(d) Breck's Cow Manure 2-1-1	Nashua	2.00	2.03	1.00	4.29			1.00	2.15		
Breck's Garden Gro 5-10-10-2	Nashua	5.00	5.02		10.78	10.00	10.43	10.00	10.04	2.00	2.33
Breck's Greenite (All-organic) 5-4-0	Nashua	5.00	5.02		7.03	4.00	6.35				
Breck's Turf Gro 8-6-2	Nashua	8.00	8.01		6.90	6.00	6.38	2.00	2.23		
Breck's Turf Gro with Deildrin 8-6-2	Nashua	8.00	**7.40**		7.10	6.00	6.61	2.00	2.70		
Buell Fertilizer Co. Exeter, N. H.											
*(e) Buell — Peat Poultry Manure	Portsmouth	3.00	3.25	3.00	6.72			1.50	3.84		
*(f) Buell Peat Poultry Manure	Manchester	3.00	**2.71**	3.00	4.37			1.50	3.60		
Consolidated Rendering Co. Boston, Mass.											
(g) Corenco Brand Sheep Manure	Portsmouth	1.25	1.14	1.00	1.52			2.00	3.62		
(h) Corenco Brand Sheep Manure	Bow	1.25	1.65	1.00	1.50			2.00	3.12		
Corenco Fertilizer 0-15-30	Plymouth				14.42	15.00	**14.13**	30.00	30.10		
Corenco Fertilizer 0-15-30	Woodsville				16.58	15.00	16.05	30.00	**28.44**		
Corenco Fertilizer 0-15-30	Durham				16.26	15.00	16.09	30.00	**28.16**		
Corenco Fertilizer 0-20-20	Woodsville				21.95	20.00	21.35	20.00	20.56		
Corenco Fertilizer 0-20-20	Durham				20.56	20.00	20.32	20.00	**15.20**		
Corenco Fertilizer 5-8-7	Dover	5.00	5.16		8.70	8.00	8.01	7.00	7.20		
Corenco Fertilizer 5-8-7-1	Woodsville	5.00	5.00		8.52	8.00	8.36	7.00	7.12	1.00	1.30
Corenco Fertilizer 5-10-10	Plymouth	5.00	5.04		10.20	10.00	10.04	10.00	9.44		
Corenco Fertilizer 5-10-10-2	Dover	5.00	5.09		10.58	10.00	10.25	10.00	**9.28**	2.00	2.25
Corenco Fertilizer 7-7-7	Thornton's Ferry	7.00	7.02		7.92	7.00	7.67	7.00	7.38		
(F) Corenco Fertilizer 7-7-7	Concord	7.00	7.28		7.66	7.00	7.45	7.00	7.22		
(F) Corenco Fertilizer 8-16-16	Manchester	8.00	8.01		17.00	16.00	16.35	16.00	16.00		
Corenco Fertilizer 8-16-16	Plymouth	8.00	7.68		16.65	16.00	16.03	16.00	16.01		
(F) Corenco Fertilizer 8-16-16	Boscawen	8.00	7.81		17.56	16.00	16.82	16.00	15.52		

(F) Sampled at a Farm
* Not Registered when Sampled
(b) Acid Insoluble Ash — 18.26
(c) Acid Insoluble Ash — 42.90
(d) Acid Insoluble Ash — 5.10
(e) Acid Insoluble Ash — 2.60
(f) Acid Insoluble Ash — 13.16
(g) Acid Insoluble Ash — 50.85
(h) Acid Insoluble Ash — 27.32

	Sample Drawn In	Nitrogen (N)		Phosphoric Acid (P_2O_5)				Potash (K_2O)		Magnesium Oxide (MgO)	
				Total		Available					
		Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
Consolidated Rendering Co. Boston, Mass. (continued)											
(F) Corenco Fertilizer 8-16-16	Ossipee	8.00	7.85		16.44	16.00	15.73	16.00	**14.96**		
* Corenco Fertilizer 10-6-4	Dover	10.00	9.51		6.64	6.00	6.57	4.00	4.52		
* Corenco Fertilizer 10-6-4 Special Organic	Portsmouth	10.00	9.66		6.44	6.00	6.12	4.00	5.12		
Corenco Fertilizer 10-10-10	Plymouth	10.00	10.28		10.96	10.00	10.73	10.00	10.36		
(F)* Corenco 10-10-10	Wilton	10.00	**8.90**		10.25	10.00	10.02	10.00	**9.28**	1.00	1.44
(F) Corenco Fertilizer 10-10-10	Ossipee	10.00	9.56		10.52	10.00	10.27	10.00	10.16		
(F) Corenco Granular Form 8-16-16	Concord	8.00	7.80		16.38	16.00	15.58	16.00	15.52		
(F) Corenco Granular Form Fertilizer 8-16-16	Concord	8.00	8.07		16.58	16.00	16.01	16.00	16.00		
(F) Corenco Granular Form Fertilizer 8-16-16	Laconia	8.00	8.00		16.70	16.00	16.01	16.00	16.00		
Corenco Ground Bone Fertilizer	Bow	2.00	3.38	22.00	27.05						
Corenco Organic Turf Fertilizer 4.75-4-0	Bow	4.75	5.34		6.40	4.00	5.77				
Muriate of Potash 60%	Woodsville							60.00	60.78		
Davison Chemical Co. Baltimore, Md.											
Davco Granulated Fertilizer 3-G 5-10-10	Goffstown	5.00	5.23		10.32	10.00	10.20	10.00	9.71		
Davco Granulated Fertilizer 3-G 8-16-16	Goffs Falls	8.00	7.68		15.58	16.00	**15.18**	16.00	16.56		
Eastern States Farmers Exchange Inc. W. Springfield, Mass.											
[1] Eastern States Fertilizer 0-15-30 W.B.	Manchester				12.62	15.00	**12.36**	30.00	30.56		
(F)[2] Eastern States Fertilizer 0-15-30 W.B.	Canterbury				14.38	15.00	**13.78**	30.00	31.76		
(F)[3] Eastern States Fertilizer 0-15-30 W.B.	Warner				15.16	15.00	14.70	30.00	30.44		
(F)[4] Eastern States Fertilizer 0-15-30 W.B.	Ossipee				14.46	15.00	14.01	30.00	30.96		
Eastern States Fertilizer 0-25-25	Manchester				31.80	25.00	31.51	25.00	**18.52**		
(F) Eastern States Fertilizer 0-25-25	Concord				26.60	25.00	26.00	25.00	25.80		
Eastern States Granulated Fertilizer 0-25-25	Woodsville				32.00	25.00	31.71	25.00	**17.56**		

Eastern States Fertilizer 5-10-10 S.M.	Manchester	5.00	5.04		10.86	10.00	10.27	10.00	10.32	+2.00	+1.60
Eastern States Fertilizer 8-12-12 L.C.	Dover	8.00	8.41		12.28	12.00	12.01	12.00	12.00	+2.00	+2.26
Eastern States Fertilizer 8-16-16	Manchester	8.00	8.93		13.20	16.00	**12.77**	16.00	16.36	1.00	2.23
(F) Eastern States Fertilizer 8-16-16	Canterbury	8.00	8.67		15.71	16.00	15.53	16.00	16.16	1.00	1.33
(F) Eastern States Fertilizer 8-16-16	Henniker	8.00	8.49		15.36	16.00	**14.95**	16.00	16.27	1.00	1.76
(F) Eastern States Fertilizer 8-16-16	Concord	8.00	8.22		16.74	16.00	16.42	16.00	16.96	1.00	1.36
(F) Eastern States Fertilizer 8-16-16	Concord	8.00	8.24		15.22	16.00	**14.98**	16.00	16.10	1.00	1.54
(F) Eastern States Fertilizer 8-16-16	Concord	8.00	8.27		17.18	16.00	16.95	16.00	16.38	1.00	1.47
(F) Eastern States Fertilizer 8-16-16	Lebanon	8.00	8.31		16.80	16.00	16.39	16.00	16.48	+1.00	+1.07
(F) Eastern States Fertilizer 8-16-16	Woodsville	8.00	8.21		17.04	16.00	16.52	16.00	16.24	+1.00	+1.05
(F) Eastern States Fertilizer 8-16-16	Ossipee	8.00	8.04		16.78	16.00	16.03	16.00	**15.25**	+1.00	+1.01
Greenlawn Fertilizer 10-5-5	Manchester	10.00	**9.20**		5.62	5.00	5.43	5.00	5.64		
Eastern States Fertilizer 10-10-10	Manchester	10.00	10.22		10.56	10.00	10.48	10.00	10.40	1.00	1.51
(F) Eastern States Fertilizer 10-10-10	Concord	10.00	10.38		10.50	10.00	10.13	10.00	10.20	1.00	1.50
(F) Eastern States Fertilizer 10-10-10	Concord	10.00	10.16		10.18	10.00	10.03	10.00	10.32	1.00	1.68
(F) Eastern States Fertilizer 10-10-10	Contoocook	10.00	9.61		10.88	10.00	10.62	10.00	10.60	+2.00	+2.74
(F) Eastern States Fertilizer 10-10-10	Lebanon	10.00	10.12		11.12	10.00	10.84	10.00	10.08	1.00	1.16
(F) Eastern States Fertilizer 10-10-10 L.C.	Lebanon	10.00	10.00		10.38	10.00	10.13	10.00	10.68	+2.00	+2.58
Eastern States Granulated Superphosphate 20%	Dover				22.20	20.00	21.13				
Eastern States Pulverized Superphosphate 20%	Dover				20.85	20.00	20.78				
Faesy & Besthoff, Inc. New York 10, N. Y.											
F. & B. Pure Steamed Bone Meal	Portsmouth	2.47	**1.98**	23.00	31.20						
Fiestar, Inc. Vernon, N. J.											
Fiestar 2-2-0	Keene	2.00	2.00		2.41	2.00	2.06				
Forward House; Div. Olin Mathieson Chem. N. Y. 22, N. Y.											
Plantrons Complete Plant Food 12-24-12	Nashua	12.00	12.09		25.20	24.00	25.04	12.00	12.16		
A. H. Hoffman Inc. Landisville, Pa.											
(i) Hoffman Sheep Manure	Concord	1.25	1.44	1.00	1.60			2.00	4.38		

(F) Sampled at a Farm
* Not Registered when Sampled
† Water Soluble MgO
[1] Boron Guaranteed 0.20%; Boron Found 0.21%
[2] Boron Guaranteed 0.20%; Boron Found 0.34%
[3] Boron Guaranteed 0.20%; Boron Found 0.26%
[4] Boron Guaranteed 0.20%; Boron Found 0.23%
(i) Acid Insoluble Ash — 33.72

	Sample Drawn In	Nitrogen (N)		Phosphoric Acid (P_2O_5)				Potash (K_2O)		Magnesium Oxide (MgO)	
				Total		Available					
		Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
Hubbard Hall Chem. Co. Waterbury, Conn.											
HH Bone Meal	Concord	2.00	3.80	23.00	27.50						
(j) HH Cow Manure & Inert Matter	Concord	2.00	2.00	1.00	1.27			1.00	1.92		
(k) HH Sheep Manure & Inert Matter	Concord	1.25	**1.00**	1.00	1.23			1.00	2.10		
* Liberty 5-10-10	Hollis	5.00	5.07		10.80	10.00	10.16	10.00	10.16		
* Liberty 7-7-7	Hollis	7.00	7.00		7.94	7.00	7.74	7.00	7.20		
International Minerals & Chemical Corp. Woburn, Mass.											
* Fertilis Plant Food 8-6-2-1	Dover	8.00	8.00		6.50	6.00	6.01	2.00	2.40	†1.00	†1.65
* Fertilis Plant Food 8-6-2-1 with Chlordane	Dover	8.00	7.64		6.56	6.00	6.01	2.00	2.23	†1.00	†1.79
International Fertilizer 0-15-30	W. Lebanon				15.58	15.00	15.10	30.00	30.08		
International Fertilizer 0-15-30	N. Haverhill				14.10	15.00	**13.70**	30.00	**28.84**		
(F)*[5] International Fertilizer 0-15-30	Manchester				14.44	15.00	**13.91**	30.00	30.01		
* International Fertilizer 0-20-20	Dover				19.95	20.00	**19.34**	20.00	20.56		
International Fertilizer 5-8-7-1	Dover	5.00	5.16		8.54	8.00	8.23	7.00	7.32	1.00	1.22
(F)* International Fertilizer 5-10-5-1	Grasmere	5.00	5.00		10.84	10.00	10.04	5.00	5.58	1.00	1.52
International Fertilizer 5-10-5-1	W. Lebanon	5.00	5.03		10.59	10.00	9.81	5.00	5.56	1.00	1.87
International Fertilizer 5-10-10-1	Dover	5.00	5.10		11.02	10.00	10.07	10.00	9.92	1.00	1.38
(F) International Fertilizer 5-10-10-1	Hollis	5.00	5.04		10.98	10.00	10.01	10.00	10.08	1.00	1.17
International Fertilizer 5-10-10-2	W. Lebanon	5.00	5.01		10.92	10.00	10.35	10.00	10.00	†2.00	†2.03
International Fertilizer 7-7-7-1	W. Lebanon	7.00	7.01		7.80	7.00	7.57	7.00	7.22	1.00	1.11
(F) International Fertilizer 8-16-16	Brentwood	8.00	7.80		16.84	16.00	16.24	16.00	16.24		
International Fertilizer 8-16-16	N. Haverhill	8.00	7.62		16.45	16.00	16.01	16.00	16.24		
* International Fertilizer 8-12-12-1.5	Colebrook	8.00	7.66		12.88	12.00	12.31	12.00	12.96	1.50	1.64
International Fertilizer 8-16-16	Durham	8.00	7.62		17.20	16.00	16.61	16.00	16.48		
International Fertilizer 8-16-16	W. Lebanon	8.00	7.87		17.16	16.00	16.61	16.00	16.32		

(F)* International Fertilizer 10-10-10-1	Grasmere	10.00	9.50		10.58	10.00	10.01	10.00	10.48	1.00	1.35
(F) International Fertilizer 10-10-10-1	Brentwood	10.00	9.78		10.34	10.00	9.76	10.00	10.02	1.00	1.06
(F) International Fertilizer 10-10-10-1	Durham	10.00	9.52		10.76	10.00	10.23	10.00	10.00	1.00	1.01
* International Mello Green 5-4-0	W. Lebanon	5.00	5.18		7.63	4.00	7.01				
(F) International Potato 5-10-10-2	Brentwood	5.00	4.70		10.50	10.00	10.01	10.00	10.12	†2.00	†2.20
International Rainbow Plant Food 5-12-12-2	N. Haverhill	6.00	6.11		12.90	12.00	12.02	12.00	12.03	†2.00	†2.04
International Rainbow Plant Food 8-12-12-2	N. Haverhill	8.00	7.32		13.46	12.00	12.85	12.00	11.44	†2.00	†2.46
(F) International Rainbow Plant Food 8-12-12-2	Colebrook	8.00	7.38		12.68	12.00	12.01	12.00	12.08	†2.00	†2.41
(F)* International Rainbow Plant Food 10-10-10-5	Derry	10.00	8.88		11.16	10.00	10.86	10.00	10.32	†5.00	†5.40
(F* International Rainbow Plant Food 10-10-10-5	Londonderry	10.00	9.38		11.14	10.00	10.91	10.00	10.16	†5.00	†5.54
(F* International Rainbow Plant Food 10-10-10-5	Wilton	10.00	9.48		11.16	10.00	10.90	10.00	10.08	†5.00	†5.07
(F)* International Superphosphate 20%	Manchester				21.00	20.00	20.42				
* 60% Muriate of Potash	Durham							60.00	60.58		
(F)* Rainbow Plant Food 10-10-10-5	Hampton Falls	10.00	9.36		11.02	10.00	10.90	10.00	10.24	†5.00	†5.47
(F)* 46% Superphosphate	Durham				47.85	46.00	46.97				
Lawn Tex, Inc. Chicago, Ill.											
Organi-Green 5-5-0	Manchester	5.00	5.34		5.18	5.00	4.64				
Merrimack Farmers Exchange, Inc. Concord, N. H.											
Merrimack Fertilizer 5-8-7	Plymouth	5.00	5.27		8.27	8.00	8.07	7.00	7.32		
Merrimack Fertilizer 5-10-10	Plymouth	5.00	5.21		10.34	10.00	10.17	10.00	9.84		
Merrimack Fertilizer 7-7-7	Concord	7.00	6.82		7.50	7.00	7.26	7.00	7.22		
Merrimack Turf Green 8-6-4	Bow	8.00	7.54		6.63	6.00	6.03	4.00	4.64		
Merrimack Fertilizer 8-16-16	Plymouth	8.00	8.08		16.72	16.00	16.00	16.00	16.08		
Natural Plant Food Co. Okla. City, Okla.											
(l) Longhorn Brand Sheep Manure	Manchester	2.00	2.01	1.00	1.06			2.00	2.01		
(m) Longhorn Cattle Manure	Portsmouth	2.00	2.00	1.00	1.27			2.00	2.57		

(F) Sampled at a Farm
* Not Registered when Sampled
† Water Soluble MgO
(j) Acid Insoluble Ash — 46.04
(k) Acid Insoluble Ash — 8.26
[6] Boron Guaranteed 0.56%; Boron Found 0.58%
(l) Acid Insoluble Ash — 22.64
(m) Acid Insoluble Ash — 18.94

	Sample Drawn In	Nitrogen (N)		Phosphoric Acid (P_2O_5)				Potash (K_2O)		Magnesium Oxide (MgO)	
				Available		Total					
		Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
(n) Ramshorn Brand Sheep Manure	Manchester	2.00	1.82	1.00	1.10			2.00	2.18		
(o) Ramshorn Sheep Manure	Portsmouth	2.00	1.63	1.00	0.78			2.00	2.00		
Old Fox Agricultural Sales Co. E. Providence, R. I.											
Old Fox Fertilizer 0-15-30	Colebrook				14.78	15.00	14.53	30.00	29.52		
Old Fox Fertilizer 5-10-10	Plymouth	5.00	5.28		11.09	10.00	10.05	10.00	10.78		
Old Fox Fertilizer 8-16-16	Colebrook	8.00	7.65		17.24	16.00	16.47	16.00	16.32		
Old Fox Fertilizer 20% Superphosphate	Colebrook				20.70	20.00	20.52				
Old Fox Organo 5-0-0	Plymouth	5.00	5.44								
Old Fox Turf Food 8-6-2	Plymouth	8.00	8.10		7.50	6.00	7.00	2.00	3.12		
Old Fox Turf Food 8-6-2 with Chlordane	Nashua	8.00	8.04		6.35	6.00	6.02	2.00	2.46		
Sagadahoc Fertilizer Co. Bowdoinham, Maine											
(F) Sagadahoc Fertilizer 8-12-12-2	Northumberland	8.00	8.21		12.70	12.00	12.27	12.00	11.72	2.00	2.34
(F) Sagadahoc Fertilizer 8-16-16-2	Northumberland	8.00	8.00		16.60	16.00	16.01	16.00	16.56	2.00	2.35
(F) Sagadahoc Fertilizer 8-16-16-2	Colebrook	8.00	8.14		16.30	16.00	15.58	16.00	16.40	2.00	2.48
O. M. Scott & Sons Marysville, Ohio											
Scott's New Turf Builder 20-10-5	Portsmouth	20.00	20.70		10.07	10.00	9.62	5.00	6.36		
Scott's New Weed & Feed 25-0-0	Portsmouth	25.00	25.13								
Sears, Roebuck & Co. Chicago, Ill.											
* Cross Country Azalea-Camellia Food 7-7-7	Manchester	7.00	6.68		8.14	7.00	8.04	7.00	7.32		
* Cross Country Lawn Food 5-5-0	Manchester	5.00	5.20		5.32	5.00	4.78				
* Cross Country Organic Lawn Food with Weed Killer	Manchester	5.00	4.71		6.14	5.00	5.76				

Cross Country Plant Food 5-10-5	Manchester	5.00	5.00		11.12	10.00	10.40	5.00	5.20
Cross Country Rose Food 5-10-5	Manchester	5.00	4.89		10.76	10.00	10.65	5.00	5.70
(p) Cross Country Sheep Manure 1.5-1-2	Manchester	1.50	2.21	1.00	1.11			2.00	3.52
Sewerage Commission of the City of Milwaukee, Milwaukee, Wis.									
(F) Milorganite	Concord	5.50	5.59	4.75	4.10	4.00	3.61		
Swift & Co. Baltimore, Md.									
New Golden Vigoro 6-10-4	Manchester	6.00	5.80		11.24	10.00	**9.36**	4.00	4.20
* Swift's Red Star Brand Plant Food 5-8-7	Manchester	5.00	5.27		8.74	8.00	8.15	7.00	7.32
Vigoro Complete Plant Food 6-10-4	Bow	6.00	5.86		10.66	10.00	10.09	4.00	4.30
Walker-Gordon Labs. Plainsboro, N. J.									
(q) Bovung — Dehydrated Cow Manure	Portsmouth	2.00	1.83	1.00	1.65			1.00	2.33

(F) Sampled at a Farm
* Not Registered when Sampled
(n) Acid Insoluble Ash — 26.30
(o) Acid Insoluble Ash — 29.48
(p) Acid Insoluble Ash — 23.75
(q) Acid Insoluble Ash — 1.31

The following information was furnished by Control Supervisor.

The following fertilizer products were unregistered with the New Hampshire Department of Agriculture at the time they were found exposed for sale. Samples were not drawn.

American Agricultural Chemical Co.	N. Weymouth, Mass.
Agrico for Turf 10-6-4	
Armour Fertilizer Works	Carteret, N. J.
Armour Sulphate of Ammonia 20.5-0-0	
Armour Bone Meal 2-27-0	
Armour 0-20-20	
Armour 20% Superphosphate 0-20-0	
Armour All Organic 5-5-0	
Armour 7-7-7	
Armour Muriate of Potash 0-0-60	
Armour Vertagreen for Acid-loving Plants 5-10-10	
Armour Camellia-Azalea Plant Food 4-8-8	
California Spray-Chemical Corporation	Plainfield, N. J.
Ortho-Gro Liquid Plant Food 10-5-5	
Clinton Nurseries	Clinton, Conn.
New Era Rose Food 10-20-10	
Faesy & Besthoff, Inc.	New York, N. Y.
F & B Evergreen Food 7-7-7	
F & B Muriate of Potash 0-0-60	
F & B Cottonseed Meal 6-1-1	
F & B Rose Food 8-10-4	
F & B Starter-Grower 15-30-15	
F & B Tomato Food 4-12-12	
Hubbard-Hall Chemical Company	Waterbury, Conn.
Hubbard Golf Course Fertilizer 8-6-2	
International Minerals & Chemical Corp.	Woburn, Mass.
Muriate of Potash 0-0-60	
Kohn Bros. Company	Chicago, Ill.
Kay-Bee All Organic 5-5-0	
Lebanon Chemical Corporation	Lebanon, Penna.
Lebanon Bone Meal 2.3-20-0	
Lexington Gardens, Inc.	Lexington, Mass.
Bu-T-Gro Rose Food 7-10-5	
Bu-T-Gro Evergreen Food 4-10-4	
Lee Patten Seed Company	Jersey City, N. J.
Patco Lawn Food 9-8-3	
Rose Manufacturing Co.	Beacon, N. Y.
Tri-Ogen Rose Food 5-10-5	
Ross Daniels, Inc.	Des Moines, Iowa
Ross Root Feeder 10-20-20	
Ross Root Feeder 15-25-10	
Ross Root Feeder 9-46-15	
Ross Pow-R-Caps 9-44-14	
St. Louis National Stockyards	National Stock Yards, Ill.
Wizard Pulverized Cow Manure 2-1-2	
Sagadahoc Fertilizer Co., Inc.	Bowdoinham, Maine
Sagadahoc Dehydrated Cow Manure 2-1-1	
Bone Meal 1.5-18-0	
Swiss Farms, Inc.	Philmont, New York
Instant Action African Violet Food 5-14-9	